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FARM PASTURE FENCING

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FARM PASTURE FENCING

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PURPOSE AND SCOPE

A well planned and properly constructed fence will give many years of useful life with a minimum of maintenance. On the other hand, poorly planned and constructed fences are expensive, regardless of first cost, since they require extra labor and expense for maintenance, repairs and reconstruction.

This bulletin is intended as a guide to those who are planning and constructing farm pasture and field fences for the control of livestock. The information should be helpful in building sturdy, durable fences that will give the best return on the material and labor invested.

Such fences are usually constructed of wood posts and barbed wire; therefore detailed information is given on this type of fence. Some reference is made to other types including woven wire, suspension, and electric fences.

Many provinces have specifications on what constitutes a “legal fence”. The requirements of a legal fence should be obtained from local authorities if this is the type of fence that is desired. Some of the fences described in this booklet may not meet the requirements of a legal fence in some areas.

MATERIALS AND EQUIPMENT

Wood Posts

Wood posts are used extensively due to availability, ease of handling, and low cost.

To minimize the annual cost of permanent fencing, wood posts should be treated. Without such treatment they do not last long. For methods of treatment see page 25.

Sizes of pressure-treated posts are given in Table 1.

TABLE 1. SIZES OF PRESSURE-TREATED POSTS

Post Use	Length (m)	Top Diameter (cm)	Approximate Burial Depth (m)
Corner, end, and draw posts	2.4	12 - 14	1.2
Corner, end, and draw braces	2.2	10 - 12	1.0
Line posts	2.0	8 - 10	0.8
	1.8	8 - 10	0.6
	1.8	6 - 8	0.6

Steel Posts

Steel posts are usually more costly than wood posts but are easier to work with. Steel posts used in corner gate and draw assemblies should be set in concrete to resist movement in the soil.

Concrete Posts

Concrete posts can be formed on the farm but must be adequately reinforced with steel. They are heavy and difficult to handle and therefore are not used widely. The cannot be driven with a power driver.

Barbed Wire

Barbed wire is available in different gauges and types. It must withstand corrosion, pressures created by livestock and remain tight even with temperature changes.

There are two types of barbed wire — double strand and single strand. The single strand is lighter and stronger, has more barbs per metre and is less costly than the double strand. Double strand must be stretched, whereas single strand needs only to be pulled taut. The common types of barbed wire are compared in Table 2.

TABLE 2. BARBED WIRE COMPARISON

Wire Type	Wire Diameter of each Strand in mm	Weight per Spool in kg	Length per Spool in m	Barb Spacing in cm	Number of Points per Barb	Approx. Breaking Strength in kg
Canadian Single Strand	2.6 2.3	23 17	400 400	13 13	4 4	600 475
Canadian Double Strand	2.4 2.3	38 33	400 400	15 15	4 4	575 475

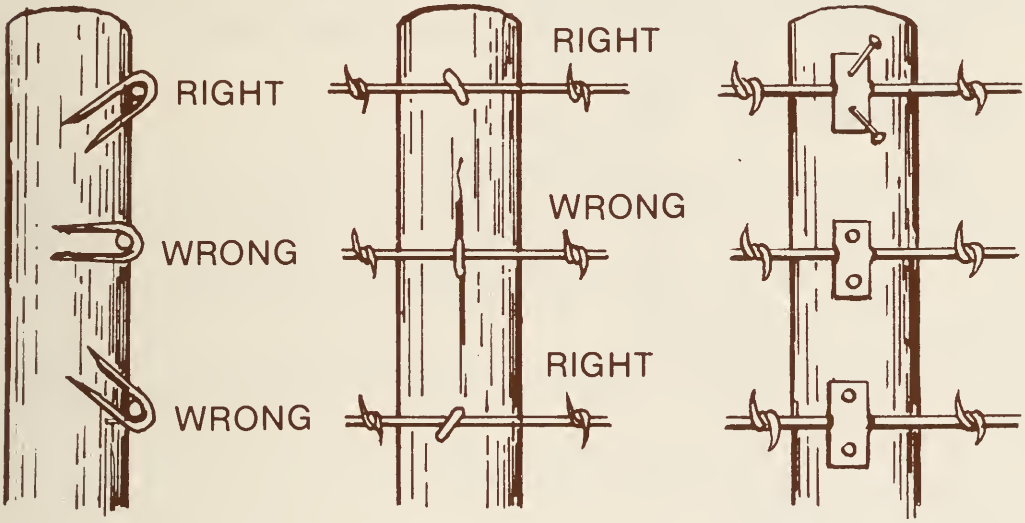
Wire Fasteners

Wood Posts:

Galvanized metal staples 38 to 45 mm long should be driven obliquely and at a slight downward angle. (See Figure 1). They should be driven in to approximately 3 mm from the wire to allow movement of the wire through the staples. If a barb is located within 25 mm of the staple, clip off the barb.

A galvanized metal clip 10 mm wide by 25 mm long and a 76 mm galvanized spiral nail in each end will hold wire more securely, especially in posts which may not be fully cured or have a tendency to crack. These metal clips are definitely required for suspension fencing where the strain on each wire fastener is more severe than in conventional fencing.

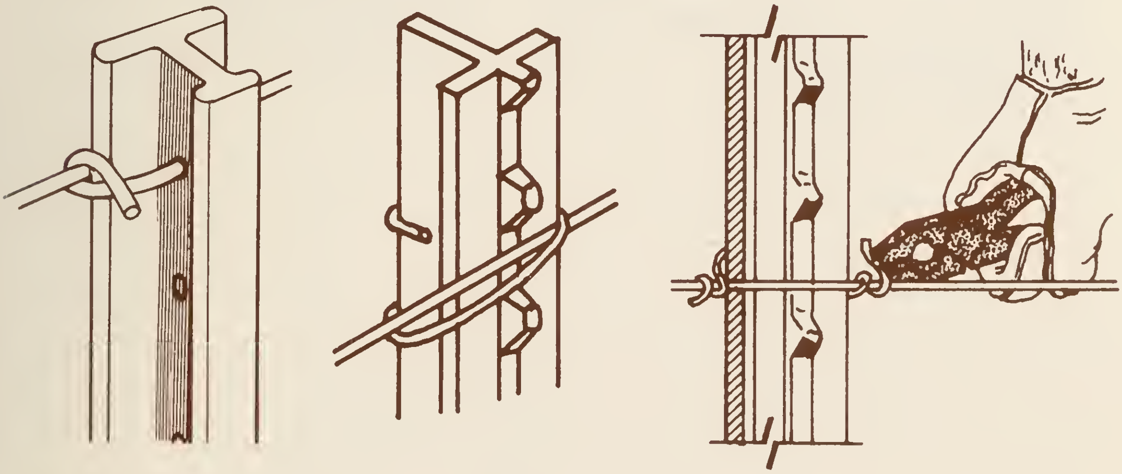
FIGURE 1. FASTENING METHODS



Steel Posts:

Various types of metal clips or galvanized steel wire can be used to fasten barb wires to steel posts. These are normally supplied with the posts. (See Figure 2).

FIGURE 2. STEEL POST FASTENERS



Wire Stays

Wire stays are used to keep wires properly spaced when posts are located at distances greater than 5 or 6 m apart.

There are two types available:

a) One-piece, which consists of a wire formed into a double spiral 1 m long. It is installed by twisting it over the top wire down to the bottom wire.

b) Two-piece stay consists of a single spiral and a straight wire 1 m long. The stay is installed by placing the spiral wire on one side of the barbed wire and inserting the straight wire through the spiral wire, locking the barbed wire into place. The two-piece stay is easier and faster to install than the single-piece stay.

Fencing Equipment

The use of power augers, drivers and wire carts can reduce labor of fencing considerably. Line posts can be set much more quickly by using a power driver than by power auger and manual tamping. In stony areas posts sometimes can be driven where a power auger will not operate.

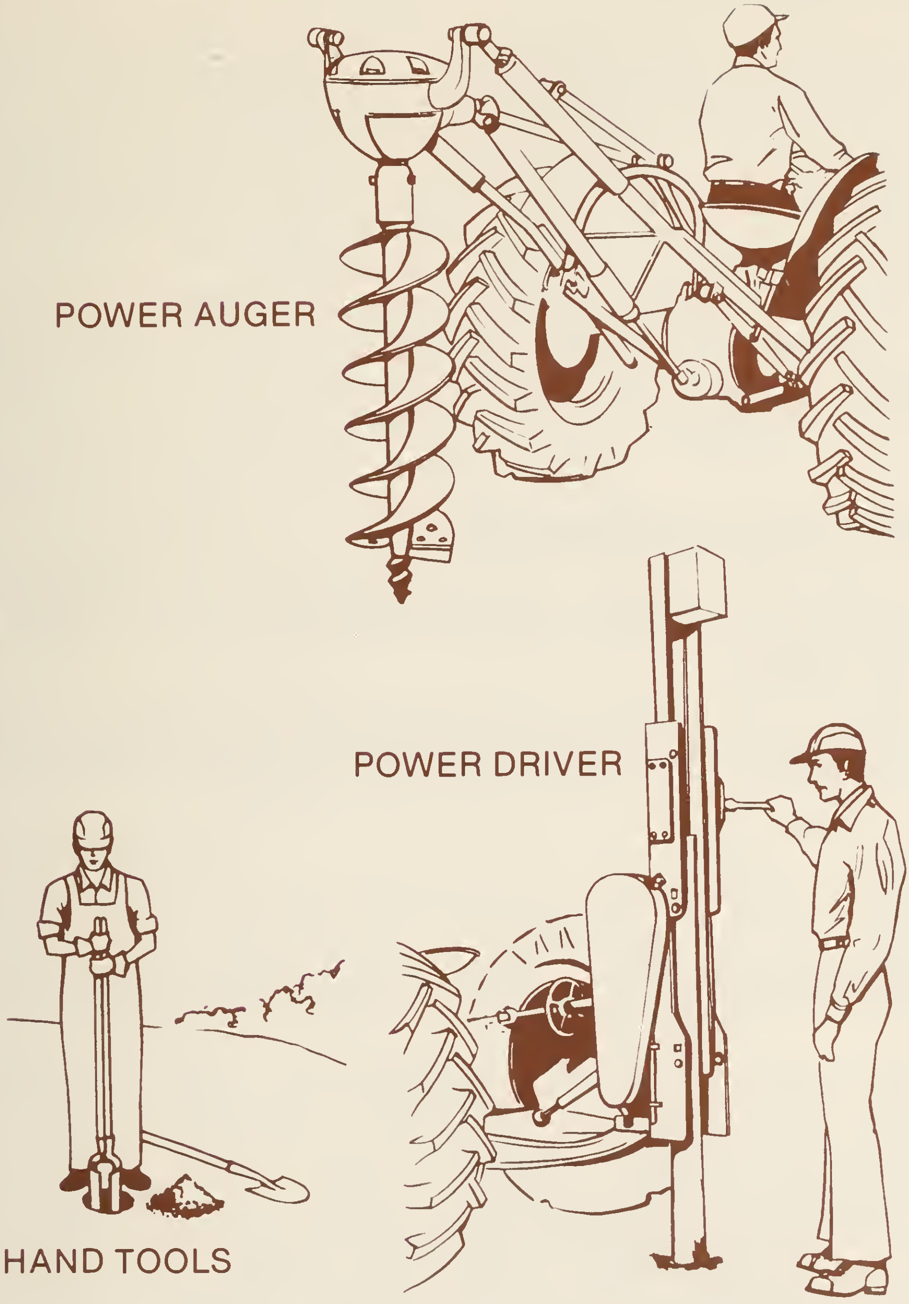
In most cases, posts are tighter in the ground after having been driven than if they had been set in the hole and tamped by hand. Typical work rates are

POSTS SET IN 1 HOUR	
Power Driver	15
Power Auger	6
Hand	4

Other Tools Required

Spade
Brace and Bit
Wire Stretcher
Wire Carrier
Swede Saw or Chain Saw
Tape Measure
Block and Tackle
Claw Hammer
Level
Fencing Pliers
Wire Cutters
Tamper
Wire Grip

FIGURE 3. POST SETTING METHODS



Corner and Ends

Corner and end assemblies are the foundation of the fence. The failure of one such assembly may result in the failure of a whole section of the fence. Therefore, corner and end posts must be firmly set and adequately braced as shown in Figure 4 and Figure 5.

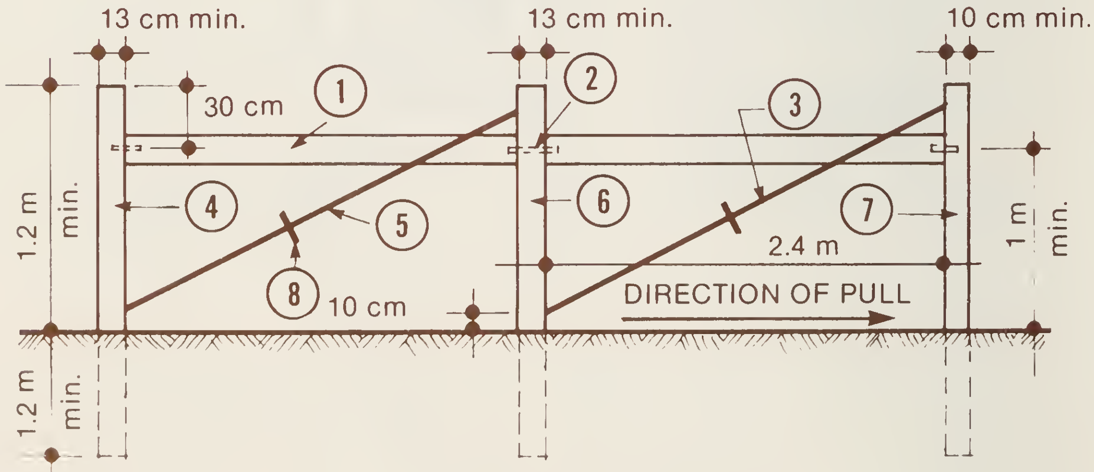
Double span assemblies as shown, have more than twice the strength of single span assemblies and only half as much vertical and horizontal movement under heavy loads.

Single span assemblies may be used for short fence sections — up to 100 m. Double span assemblies should be used on fence lengths of 100 to 400 m. Longer fences should be constructed with double span assemblies plus intermediate pull-post assemblies.

Dimensions of Components

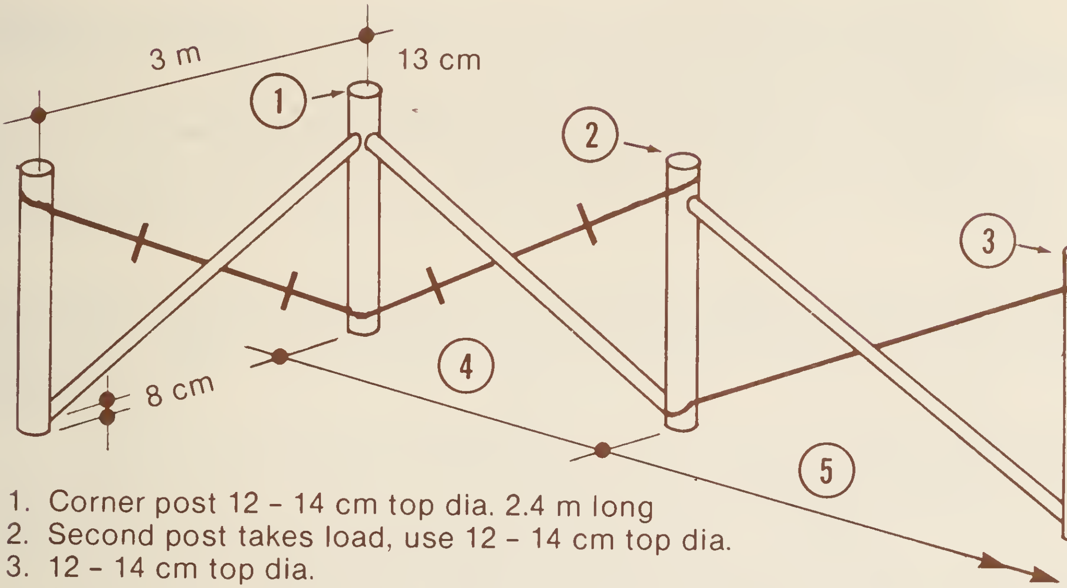
- Corner and end posts: 12 to 14 cm top and 2.4 m length.
- Brace posts: 10 to 12 cm tops (See Figure 4 and Figure 5) and 2.4 m length.
- Braces: 10 cm minimum end diameter and 3 m maximum length.
- Brace wires: four strands (2 loops) of 3.7 mm diameter wire.

FIGURE 4. END POST ASSEMBLY — HORIZONTAL WOOD BRACES



1. Brace
2. Steel dowel
3. Brace wire: 4 strands 3.7 mm dia. wire
4. Corner post
5. No. 1 Brace post
6. No. 2 Brace post
7. Slat or rod for twisting

FIGURE 5. END POST ASSEMBLY — DIAGONAL WOOD BRACES



1. Corner post 12 - 14 cm top dia. 2.4 m long
2. Second post takes load, use 12 - 14 cm top dia.
3. 12 - 14 cm top dia.
4. Short lengths of wire between corner post and first brace post
5. To stretcher

Construction Details for Horizontal Brace Assemblies

Corner assemblies are constructed as two end assemblies with a single end post.

1. Set the corner or end posts and brace posts at least 1 m deep and spaced as required to accommodate braces 2 to 3 m long.
2. Lean the top of the end or corner post 3 cm away from the direction of fence pull so that it tends to be drawn into a plumb position when the fence wires are stretched.
3. Fasten the wood brace to both posts 30 cm below their tops. Wood braces should be connected to the posts using a 1 x 10 cm steel dowel at each end extending 5 cm into both the brace and the post.
4. Attach the brace wire of four strands of 3.7 mm diameter galvanized steel wire stapled 10 cm above grade on the end post and 10 cm below the top of the brace post. Tighten by twisting with a strong stick or rod. Leave the stick or rod in place for future tension adjustment.

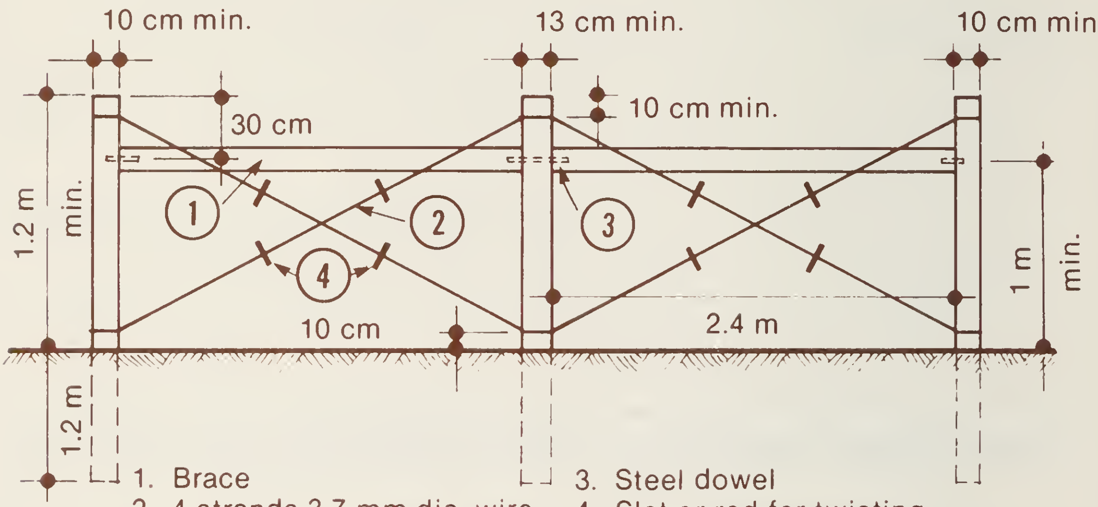
The diagonal brace assembly, Figure 5, is recommended for use in soft soils. The construction details are similar to those above. However, in this design the fencing is stretched from the first brace post (rather than the end post) since the design provides for maximum strain to be taken at this point. Short lengths of barbed wire or woven wire fencing are used in the space between the end post and the first brace post after stretching is completed.

Pull-post Assemblies

Pull-post assemblies should be placed a maximum of 400 m apart in straight runs and at the top and bottom (ridge and valley) or appreciable changes in slope.

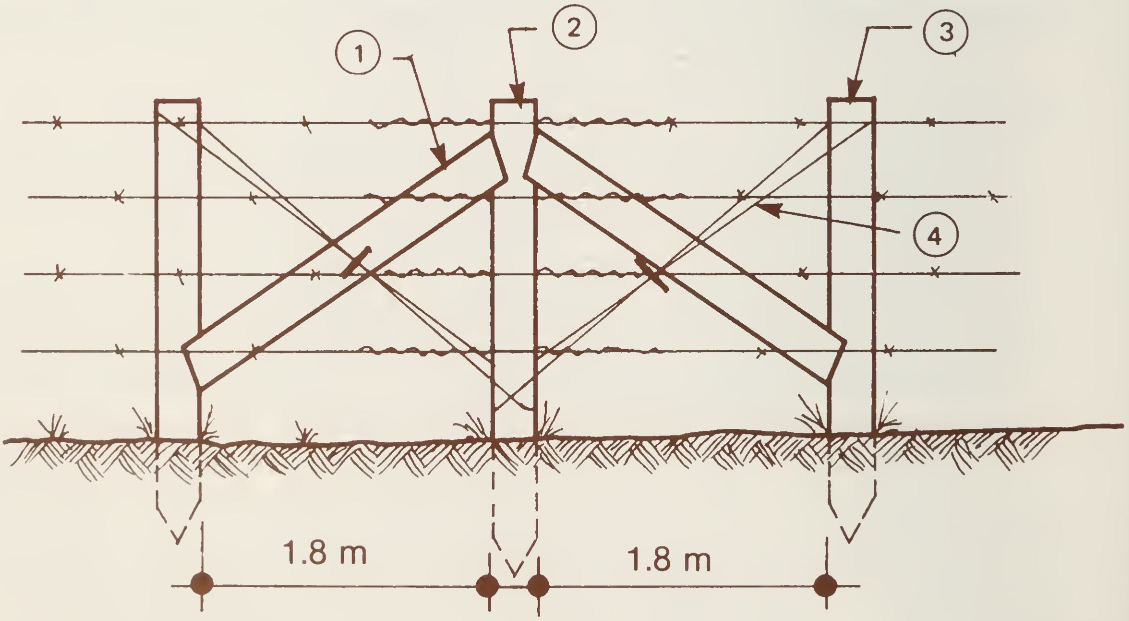
Construction details are similar to those for end and corner assemblies except that the center post is the "anchor" post and the two side posts are brace posts. Two alternative designs are shown below:

FIGURE 6. PULL-POST ASSEMBLY — HORIZONTAL WOOD BRACES



1. Brace
2. 4 strands 3.7 mm dia. wire
3. Steel dowel
4. Slat or rod for twisting

FIGURE 7. PULL-POST ASSEMBLY — DIAGONAL WOOD BRACES



1. 2.2 m cull post
2. 2.4 m post with 12 - 14 cm top
3. 2.2 m post with 10 - 12 cm top
4. 2 loops 3.7 mm dia. wire

Preparation

Before constructing a fence it may be necessary to clear and/or lay out the fence line.

Clearing

Fence lines should be cleared of all obstructions that may interfere with the construction or maintenance of the fence. This includes trees, brush, stumps, large rocks, tall grass, and, possibly, old fences.

If much clearing is required, a bulldozer may be used. This piece of equipment will remove large obstructions, level high spots and fill in low spots, all in one operation. Small brush and grass can be cleared with heavy tillage equipment.

The cleared strip should be wide enough for a roadway during fence construction and a fire guard later. It should be wide enough, also, to allow the use of a sprayer for weed control.

Laying Out a Fence Line

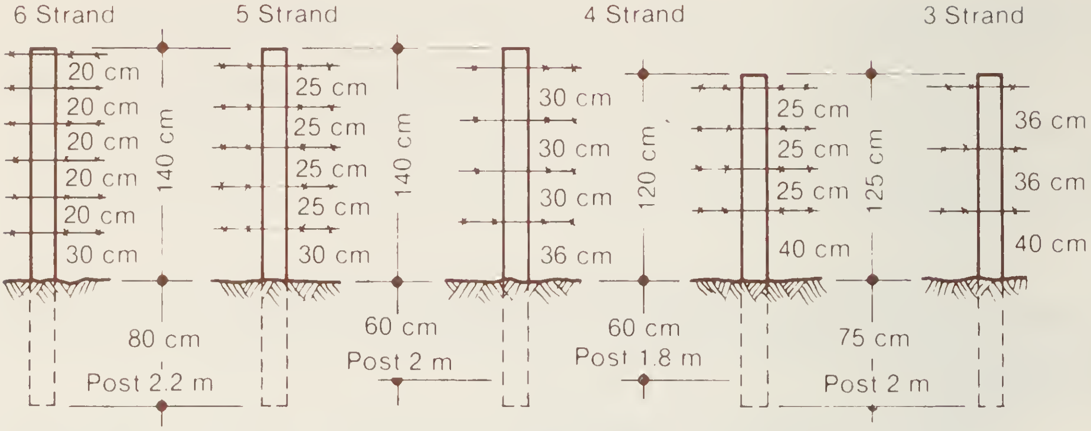
Corners of the fenced area should be located first and marked with stakes. On long, straight fence lines a few intermediate stakes should be sighted in. Then a single strand of barbed wire can be stretched along the fence line.

Finally, the position of each line post can be marked with a stake at intervals of about 5 m along the wire. The alignment of all stakes should be checked by sighting before construction is begun. Surveying equipment, if available, would be helpful in laying out fence lines accurately.

Wire and Post Spacing

Line posts, 6 to 10 cm in diameter and 1.8 to 2.2 m long should be set 0.6 to 0.8 m into the ground and spaced about 5 to 6 m. Use the shorter poles for low fences and the deeper set poles for soft ground. Post spacings should be reduced to 4 m where the terrain is uneven or where a particularly strong fence is needed. When the land is flat and crowding of livestock is not a factor, post spacing can be increased to 7 m. Typical wire spacings are shown in Figure 8.

FIGURE 8. WIRE SPACING AND LINE POST SIZES



Wire Stretching and Stapling

When installing barbed wire, unroll, stretch and fasten one line at a time starting with the top strand. The steps are as follows:

— Staple one end of the wire to the anchor post on the end or corner assembly, leaving enough wire free to wrap around the post and splice. With a horizontal brace end post assembly, the anchor post is the end post. With a diagonal brace assembly, the anchor post is the first brace. As a safety measure, remove barbs from wire to be wrapped around gateposts.

— Wrap the wire around the anchor post and splice it onto itself, three and a half to four turns.

— Unroll the wire straight off the roll along the ground on the *livestock* side of the posts.

— Attach a fence stretcher or block and tackle to the end or corner post at the other end of the fence line, or to a temporary stretcher post set about 2.4 m beyond the anchor post. Attach the barbed wire to the fence stretcher.

— Stretch the barbed wire until it is fairly tight, springy to the touch. Check the wire often while stretching to make sure it is riding free throughout its length. Stand on the opposite side of the post from the wire and stretcher unit in case the wire breaks.

— Staple the wire to the anchor post.

— Remove the barbs from sufficient wire to wrap around the anchor post and splice onto itself.

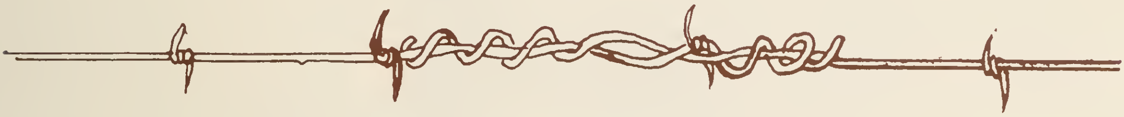
— For double-strand wire, cut and untwist one strand of wire while maintaining tension on the other strand. Wrap the cut strand around the post and back on itself three and a half or four turns, leaving enough space between the strands to inter-wrap the second strand. Release the wire stretcher, cut the second strand, wrap it around the post and splice it.

- Single strand wire must be wrapped around the post to which the stretcher is attached and spliced onto itself before the stretcher is released.
- Fasten the wire to all the line posts using 38 to 45 mm galvanized staples. Staples should be driven on a slightly downward angle into the posts and slightly off the vertical. They should be driven to within 3 mm of the wire to allow wire to move through the staples if necessary.

Splicing

Use a wrap splice for barbed wire. The two ends to be joined are each wrapped four times around the other wire as shown in Figure 9.

FIGURE 9. BARBED WIRE SPLICE



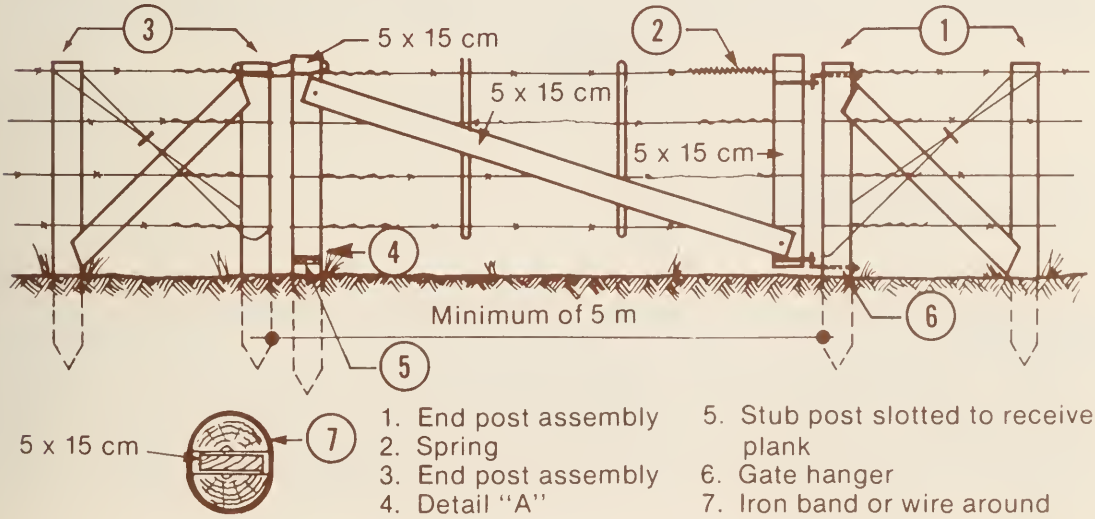
Barbs 10 - 12 cm apart

Gates

The location of gateways needs to be well planned to facilitate travel into and around the farm fields. End-post assemblies are required on each side of a gateway.

Gates may be constructed of various materials. Steel and aluminum gates are available from metal building suppliers. Plans for wood gates and cattle guards as well as for hinges and latches are available from the Canada Plan Service and local extension agricultural engineers.

FIGURE 10. STANDARD SPRING GATE



1. End post assembly
2. Spring
3. End post assembly
4. Detail "A"
5. Stub post slotted to receive plank
6. Gate hanger
7. Iron band or wire around stub post

Fencing Into Water

Fences extending into water should have an end-post assembly constructed on firm soil above the high water mark. The fence can be extended from this end-post assembly into the water as far as soil footing and water depth will allow.

Fencing Over Gullies and Ditches

Fencing over gullies and ditches may be accomplished as shown in Figure 12. The line fence is stretched straight across the top of the ditch or gully to maintain wire tension. Additional wires are stretched from the last line post at the top of the ditch bank on one side to one or more posts in the ditch or gully and up to the line post on the other side.

FIGURE 11. FENCING INTO WATER

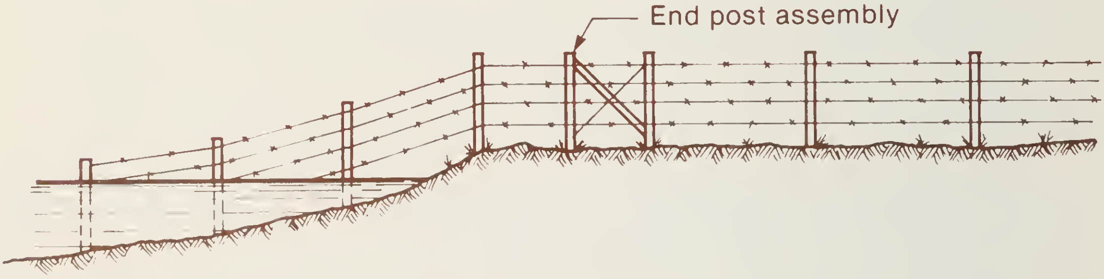
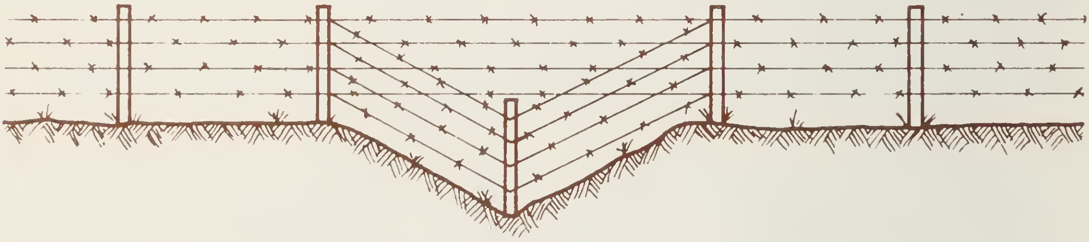


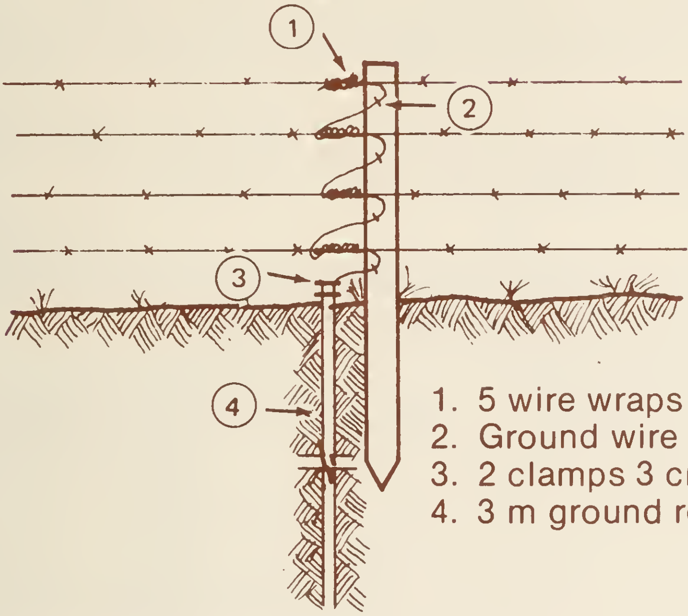
FIGURE 12. FENCING OVER GULLEY



Grounding Fences

Wire fences should be grounded to protect livestock against lightning. Fences of wood posts should be grounded every 200 to 250 m using a 16 mm x 3 m galvanized steel rod or 19 mm x 3 m galvanized steel pipe driven deep enough into the ground to reach permanent moisture, and attached securely to each barbed wire strand (5 wraps) with 3 mm diameter galvanized wire. Fences built with steel posts at least every 50 m will usually not require additional grounding.

FIGURE 13. FENCE GROUND



1. 5 wire wraps (tight)
2. Ground wire stapled to post
3. 2 clamps 3 cm apart
4. 3 m ground rod

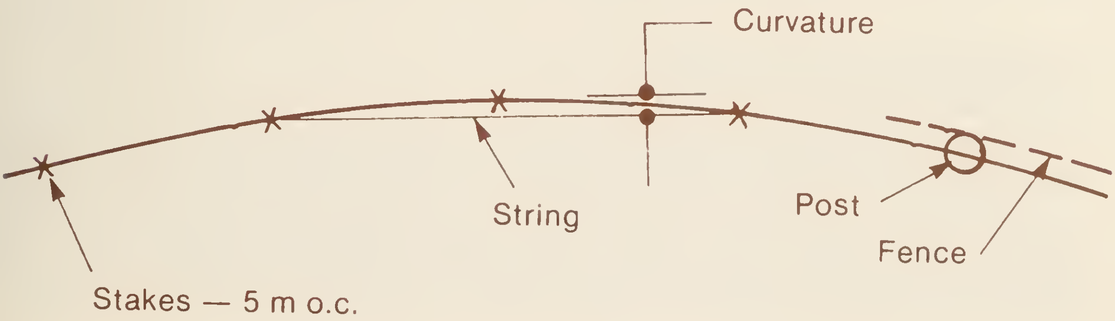
CURVED FENCES

Curved fences are sometimes desired in order to follow contour lines or the tops of river banks, etc. The procedure for construction is as follows.

Spacing Line Posts

Lay out a smooth curve with stakes placed 5 m apart. Select three consecutive stakes anywhere along the proposed fence line. Stretch a string directly from the first to the third stake. Measure the distance from the second stake to the string as shown in Figure 14.

FIGURE 14. FENCE CURVATURE



Repeat this operation wherever there is a noticeable change in curvature.

If the distance between the center stake and the string is 10 cm or less, the fence posts can be placed at the stake points; if the distance is greater than 10 cm, the posts should be spaced closer than 5 m as indicated in Table 3. The closer spacing is used to ensure that the tension of the wires does not cause the posts to lean excessively.

After spacing line posts in this way, check by sighting to see that no post varies from a smooth curve. This will assure that the wire will pull equally against each post.

TABLE 3. RECOMMENDED POST SPACINGS FOR CURVED FENCES

Distance from the center stake to string (cm)	Recommended post spacing (m)
10 or less	5.0
10 - 13	4.6
13 - 15	4.3
15 - 20	3.7
20 - 36	3.0
36 - 51	2.4

Example: If the distance from the center stake to the string measures 14 cm, the line posts should be spaced 4.3 m apart. If the distance were 25 cm, the post spacing would be 3 m, etc.

Setting the Posts

Posts should lean outward about 5 cm at the top so that when the wire is stretched, the posts will tend to be pulled into an upright position.

Placing the Wire

Place the wire on the outside of the curve so that it pulls against the posts when stretched. See Figure 15.

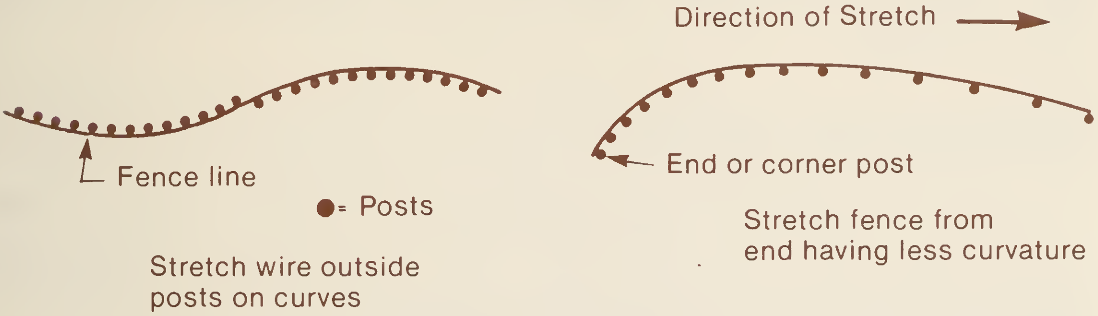
Stretching the Wire

The wires on a curved fence should be tightened only about one-half to two-thirds as tightly as on a straight fence. The sharper the curve, the lower the wire tension should be. While stretching the wire, walk back and forth along the fence releasing the wire wherever it has caught on the posts.

On sharp curves it may be necessary to stretch the wires at 50 m intervals; on wider curves, 100 m may be satisfactory.

If the radius of curvature changes, start a new wire at the point of sharpest curvature and stretch it from the other end.

FIGURE 15. STRETCHING WIRE FOR CONTOUR FENCES


Direction of Stretch
Fence line
● = Posts
Stretch wire outside posts on curves
End or corner post
Stretch fence from end having less curvature

Wire placing

Wire stretching procedures

WOVEN WIRE FENCES

Woven wire is used where hogs or sheep are to be pastured. Woven wire fabric 66 cm high and placed 8 to 10 cm above the ground will hold hogs on pasture provided a single strand of barbed wire is stretched beneath the woven wire to prevent rooting under the fence. For sheep and cattle a higher fence is required. For cattle, and where predators are a problem with sheep, one or more strands of barbed wire above the woven wire is required.

Construction

The procedure for clearing and laying out a woven wire fence line and determining the post spacing is the same as for barbed wire fences. One strand of barbed wire stretched at the bottom is useful in aligning the line posts.

Starting at one anchor post, remove two or three vertical stay wires from the woven wire fence, pull into position, staple the line wires to the post, wrap the end of each line around the post and splice it onto itself.

Stretching is done as for barbed wire fences except that a clamp bar at least as high as the fencing is used. For all fences over 80 cm high use double-jack stretchers. Never pull the top or bottom of the fence very far ahead of the other. In other words, keep the stay wires as nearly vertical as possible.

Before removing the stretcher, loosen and slide three or four vertical stay wires toward the stretcher to provide sufficient length of free ends to wrap around the anchor post. Starting with the center line wire, staple, cut and wrap it around the post, splicing it onto itself. Do the same with every alternate line wire except the top and bottom ones. Then the remaining line wire should be stapled, cut, wrapped and spliced, leaving the bottom wire to next to last and the top line wire last.

Starting at the end farthest from the stretcher, fasten the fencing to the line posts. First staple top and bottom line wires, then alternate line wires.

SUSPENSION FENCES

Suspension fences are constructed of three, four or five strands of barbed wire attached to end assemblies and heavy line posts spaced from 15 to 50 m apart. Wire stays spaced from 3 to 6 m apart are used to space the wires as required.

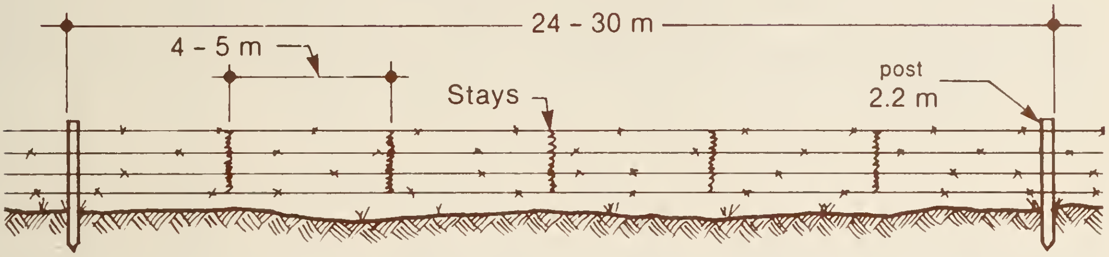
Suspension fences are not suited to hilly or steeply rolling land. It is questionable whether they are practical where posts are of low cost and can be driven easily. Suspension fencing does, however, have an advantage in swamps, in extremely stony areas or where bedrock is close to the surface.

The suspension fence can be considered as a series of panels with resilience or whip-like action. When pressure is exerted against the top wire, the bottom wire moves in the opposite direction. A cow attempting to reach over the top wire is struck in the knees by the bottom wire. This type of fence tends to sway in the wind, which seems to discourage livestock from attempting to break through.

Because of this swaying action staples are not satisfactory for attaching the barbed wire to wood posts. Galvanized metal clips, 10 x 25 mm in size, are nailed in place over the wire with two 76 mm spiral nails.

The following are two methods of constructing suspension fences:

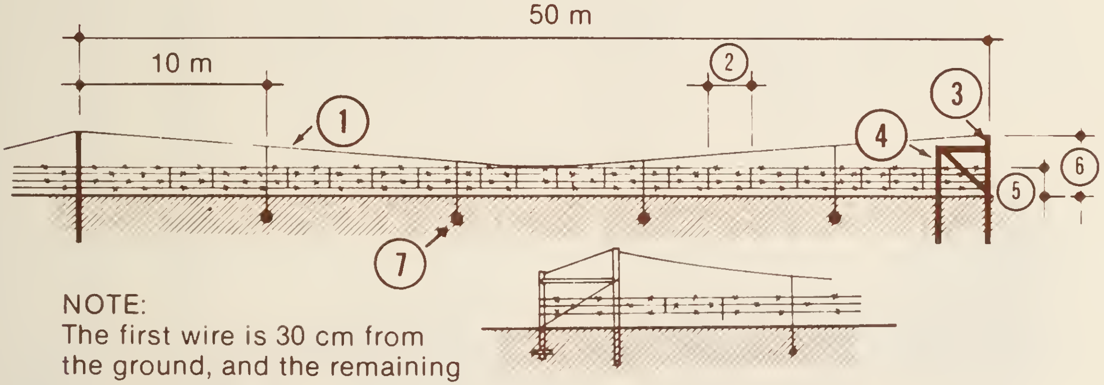
FIGURE 16. TYPE "A" SUSPENSION FENCE



Notes:

- Suspension fences should be used only on flat or gently undulating ground.
- Corner assemblies must be very well anchored.
- First wire is spaced 36 cm from the ground and the remaining wires 25 cm apart.
- The wire should not have more than 8 cm sag per 30 m span.

FIGURE 17. TYPE "B" SUSPENSION FENCE



NOTE:
The first wire is 30 cm from the ground, and the remaining wires are 25 cm apart.

Alternative end method of bracing

1. 3.7 mm dia. wire or light cable
2. 3 - 5 m
3. 4 m post
4. 2.4 m post
5. 1.1 m
6. 2.4 m
7. Anchor

Notes:

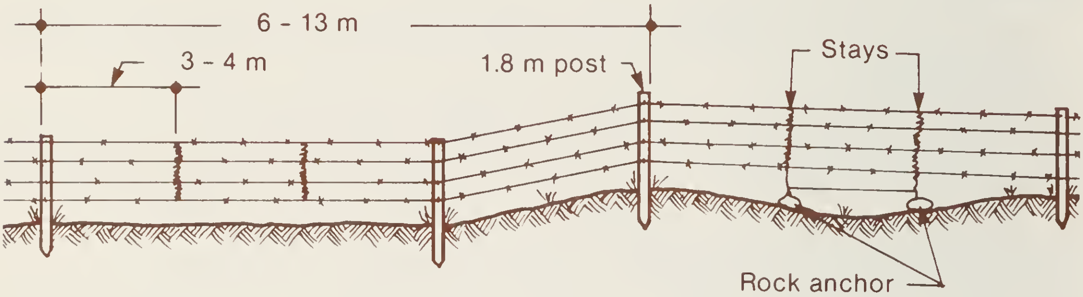
- With this type of fence, spans of up to 90 m have been used.
- Metal clips must be used rather than staples to attach the barbed wire to the wooden posts.

Partial Suspension

This type of fence is used in areas where the ground is gently rolling and posts are placed every 6 to 14 m. Wire stays are spaced between the posts at 3 to 5 m intervals.

Where the fence crosses a depression, a weight or anchor is used to hold the fence panel in place 40 cm from the ground. A line post should be used on the high spot of a knoll to provide the necessary clearance.

FIGURE 18. PARTIAL SUSPENSION FENCE



The following table compares the material needed for various methods of barbed wire fence construction for 1600 m of fence, using one gate every 800 m

TABLE 4. MATERIAL COMPARISONS FOR VARIOUS FENCE TYPES PER 1600 METRES

Item	Specifications	Post Spacings								
		5 m			7 m			30 m (suspension)		
		3 Wire	4 Wire	5 Wire	3 Wire	4 Wire	5 Wire	3 Wire	4 Wire	5 Wire
Standard posts*	1.8 m or 2.2 m long, 8–10 cm diameter top	320	320	320	244	244	244	55	55	55
Draw, gate and corner posts*	2.4 m long 12–14 cm diameter top	9	9	9	9	9	9	9	9	9
Brace posts*	2.2 m long 10–12 cm diameter top	20	20	20	20	20	20	20	20	20
Barbed wire*	2.4 mm 2 strand or 2.6 mm 1 strand	12 Spools**	16 Spools	20 Spools	12 Spools	16 Spools	20 Spools	12 Spools	16 Spools	20 Spools
Staples*	38 mm galvanized	6 kg	8 kg	10 kg	4.5 kg	6.5 kg	8 kg	1.5 kg	2 kg	2.5 kg
Wire stays	galvanized	nil	nil	nil	nil	nil	nil	350	350	350

*Add 10% for rolling topography
**400 metres per spool

ELECTRIC FENCES

This method of fencing is very useful for subdividing fields where the fence must be moved regularly. It is also useful to provide temporary perimeter fencing around fields which are to be grazed after the crop has been harvested.

One or two strands of galvanized smooth or barbed wire is supported on steel rods or wood posts by a polyethylene or porcelain insulator. The posts are usually spaced 9 to 15 m apart. Insulators should be attached to wood posts using double-headed nails.

A high voltage, low amperage electrical pulse is applied to the wire at regular intervals by an electrical controller. The controller *must* be C.S.A. approved to prevent fatalities occurring to livestock and humans. Some non-approved controllers have caused fires.

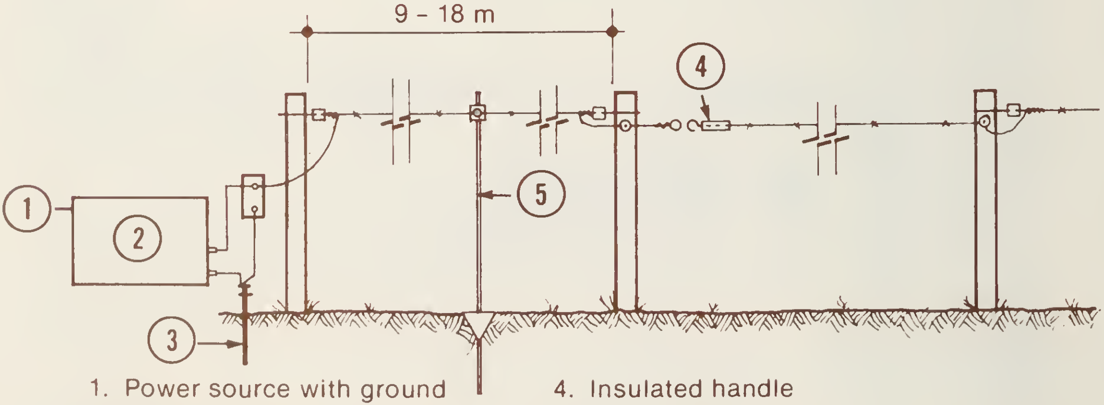
A good fence controller will have a built-in lightning arrestor, a fused input and a light to indicate the state of operation of the unit.

Generally, transistorized or solid-state controllers produce higher output voltages than units with a mechanical circuit interrupter. Controllers with higher output voltages will generally operate longer spans of fence.

The ground connection should be connected to a 3 m x 16 mm galvanized steel ground rod with a No. 6 standard copper wire. Fences should be located in a dry area.

Homemade controllers are dangerous and should never be used. To adequately protect the controller from lightning damages, a second lighting arrestor should be installed as shown in Figure 19.

FIGURE 19. ELECTRIC FENCE GATE CONSTRUCTION

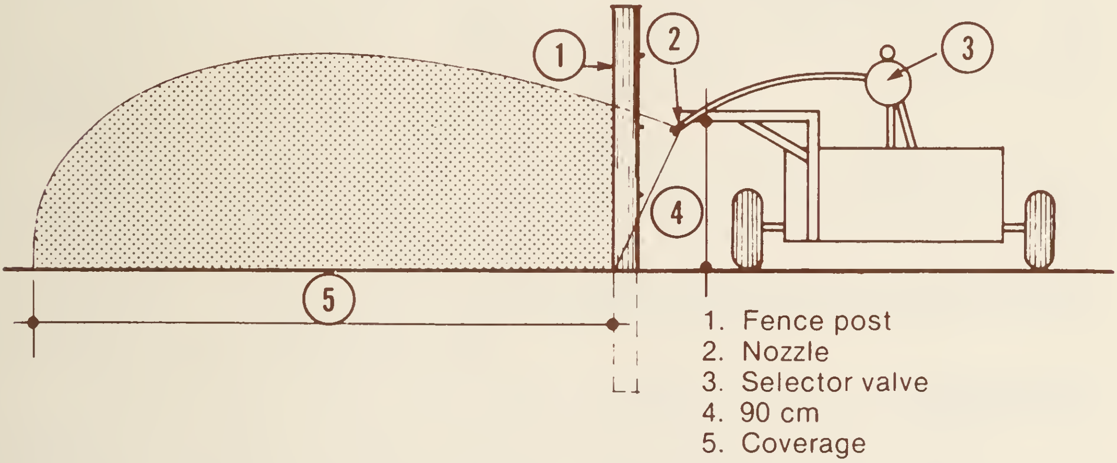


1. Power source with ground
2. Controller (CSA approved)
3. 3 m ground rod
4. Insulated handle
5. 1.2 m x 1 cm steel rod

FENCE MAINTENANCE

- Prior to constructing the fence, clear a strip 5 to 6 m wide on each side of the fenceline. This strip should be free of brush, stones, roots, etc.
- Keep brush under control by spraying, using a tractor and field sprayer. Booms should be removed and one or two off center nozzles located at the back of the sprayer. Spraying should be done in the early leaf stage with a recommended brush killer. See Figure 20.

FIGURE 20. FENCE LINE SPRAYING



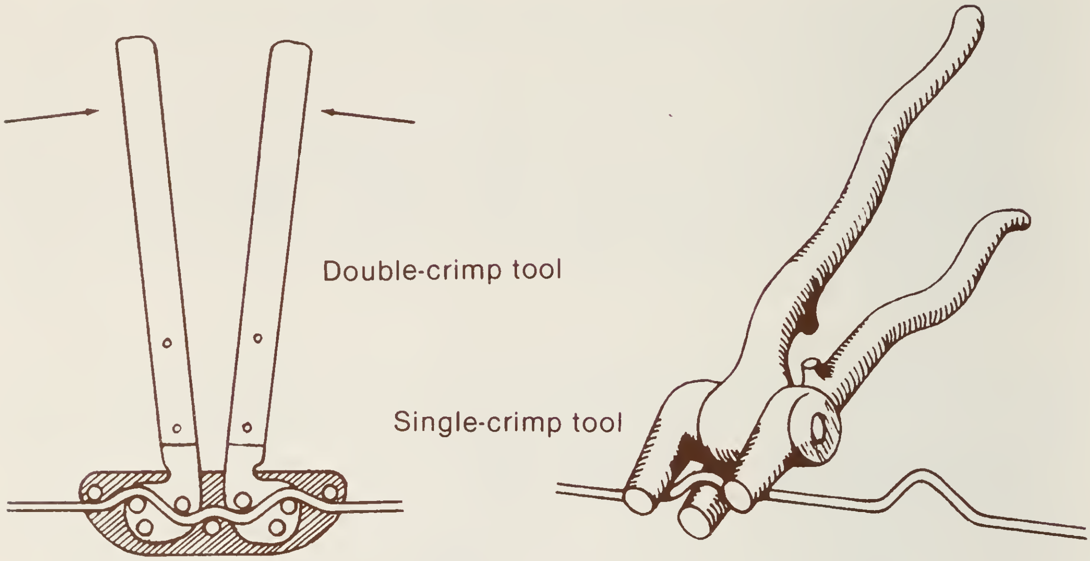
1. Fence post
2. Nozzle
3. Selector valve
4. 90 cm
5. Coverage

TEEJET OFF-CENTER NOZZLE TIPS Pressure 275 kPa

Nozzle Size	Width of Coverage (m)	Application Rate 6 km/h	Application Rate 8 km/h
OC - 10	5.5	67 L/ha	50 L/ha
OC - 20	7.3	100 L/ha	75 L/ha
OC - 40	8.1	185 L/ha	140 L/ha

- Reset, repair or replace anchor assemblies whenever needed. If one fails, the whole fence or a section of it may fail.
- Replace loose or broken wires to prevent further damage.
- Tension can be increased in loose barbed wire by adding tension curves with the tools shown in Figure 21.

FIGURE 21. TOOLS FOR INSTALLING TENSION CURVES



FENCE POST TREATMENT

Purpose

Wood posts decay as a result of growth of fungi. Decay will take place only if appropriate conditions of moisture, air supply, temperature and food supply exist.

Decay is usually most serious at the ground line because of ideal conditions for fungal growth. Since it is not practical to control moisture, air supply or temperature, the easiest method of reducing rate of fungal growth is to poison the food supply by chemical treatment.

Pressure-treated wooden posts are normally better than posts which have been treated with a non-pressure process as the preservative is forced into the wood to a greater depth. A considerable amount of equipment is necessary for pressure treating. For this reason pressure-treated posts normally must be purchased from lumber yards or suppliers of pressure-treated wood. Pentachlorophenol, creosote, or chromium copper arsenate (CCA) are usually used for pressure treatment. Creosote is the highest in cost, pentachlorophenol is next and CCA is the least costly.

The following preservative treatments outline processes which can be carried out on the farm.

TABLE 5. EXTENDED LIFE OF POSTS USING VARIOUS TREATMENTS

Kind of Wood	Untreated Life (yr.)	*Penta* Extra Life	*CCA* Extra Life	*Creosote* Extra Life	*Napthenates* Extra Life	*Bluestone* Extra Life
Cedar	20–30	10–15	10–15	15–20	10–15	5–6
Tamarack	8–10	10–15	10–15	15–20	10–12	3–6
White Pine	5–8	8–12	8–12	10–15	5–10	3–6
Birch	3–5	8–12	8–12	10–15	5–10	3–6
Willow	5–8	8–10	8–10	10–15	5–10	3–6
Spruce	3–5	5–10	5–10	10–15	5–10	3–5
Poplar	3–5	5–10	5–10	10–15	5–10	3–5

Preparation for Treatment

Cutting: Cut posts when the sap is up in the trunk and branches. This makes peeling easier and reduces end to end cracking. Reasonably straight and knot-free posts should be cut, as crooked posts are very difficult to drive.

Peeling: Posts should be peeled and air dried prior to treatment, except where the sap displacement method is used. When peeling, be sure to remove the inner bark as it inhibits the movement of the preservative into the wood. All trimming, sharpening, drilling, etc. should be done prior to treatment in order not to expose untreated wood.

Seasoning: Most treatment methods require well seasoned posts. The sap must have evaporated to make room in the wood for the preservative.

Pile the posts to allow free movement of air and to prevent bending of the posts. Keep posts off the ground, under cover, and shaded to prevent cracking.

Seasoning normally takes 2 to 4 summer months, or 6 to 8 months over the winter period.

The degree of seasoning can be determined by weighing a few posts weekly. When a post loses less than 0.5 kg per week in good seasoning weather or when a post shows evenly distributed checks (sometimes cracks) throughout the post, it should be ready to treat.

Treatment Methods

1. Pentachlorophenol

"Penta" is not soluble in water and therefore is not leached away by moisture. It can be purchased in a ready-to-use form of 5% "Penta" or in a concentrated 41% liquid. One litre of concentrate is diluted with 9 L of fuel oil or kerosene to yield 10 L of approximately 5.5% solution by weight.

The posts are submerged in a tank of 5.5% solution for 48 to 72 hours. Posts *must* be well seasoned to absorb the preservative. Posts will absorb 1.5 to 2 L depending on size. Paint may not stick to posts treated in this manner.

2. Creosote

Creosote is a toxic oil of low volatility which is very effective, but bothersome to work with and is relatively expensive.

Dry peeled posts are stood upright in hot creosote (95°C) for 1 to 4 hours. The butts of the posts should be submerged to a depth of 25 cm above ground line. After the hot treatment they are submerged full length in a tank of cold creosote for a further 1 to 4 hours.

Care must be taken to prevent the creosote vapor from catching fire as the fumes are very inflammable.

3. Naphthenates

Copper naphthenate is sold under various trade names from various retail outlets. It is available in the 2% ready-to-use form to be applied by brushing or spraying onto dry wood. Zinc naphthenate is similar to copper naphthenate but is not as effective for preservation of fence posts.

4. Bluestone (Copper Sulphate)

Bluestone can be applied by two methods — one for green posts, the other for dry posts.

Sap displacement method (for green posts): Freshly cut poplar or willow posts may be treated by peeling, trimming and immersing the butts as quickly as possible after cutting into a vat containing 1 kg of bluestone for each 7 L of water.

This method works best during warm spring weather when the sap is moving up into the trees. The strong bluestone solution is drawn up in a wick-like action into the cells as the moisture evaporates from the top of the posts.

Treatment may take 2 to 4 days and is usually complete when the bluish green color reaches the top of the posts. Each post may absorb 2 L of solution.

Freshly treated posts should be allowed to dry slowly to reduce the risk of bringing the preservative to the surface. If posts are used prematurely some of the preservative may be leached away by water, and decay may result. This method of treatment provides good results at a reasonable cost especially when sap movement conditions are good.

Hot and cold soak treatment (for dry posts): Dry posts should be peeled and thoroughly seasoned prior to treatment.

Posts should be immersed in a hot solution (70-90° C) of 1 kg of bluestone to 5 L of water for 1 hour. They should be quickly transferred to a cold solution for another hour.

Other chemicals such as zinc chloride, zinc sulphate and sodium dichromate are equally effective but slightly more costly.

Precautions

- Bluestone (copper sulphate) is extremely corrosive to steel. Treatment vats should be wooden, concrete or lined with polyethylene.
- If posts are not properly cured (dried) after treatment, galvanized wire and staples may be seriously weakened by corrosion. Also, the bluestone is easily leached out of the post.
- Copper sulphate solution is poisonous to animals. Do not leave tanks unattended around livestock.
- Licking of saturated earth has been known to kill livestock. Do not pour any unused chemical on ground accessible to livestock.

Tips

- Used crankcase oil, lamp black and charring with fire are *not* effective methods of preserving posts.
- Pressure treatment of posts generally increases their life more than farm treatment methods. Therefore, the annual cost is usually lower for pressure-treated posts.

FENCE BUILDING TIPS

- — Wear heavy, close fitting clothing and heavy leather gloves.
- — Wear safety boots for ankle and foot protection.
- — Keep a first aid kit handy.
- — Keep all children away from fencing operations.
- — When stretching wire, stand on the side of the post opposite the wire.
- — Carry staples in an apron away from the body.
- — Keep all equipment in a proper operating condition.
- — Treat wood fence posts with a preservative.
- — Treated portion of post should extend 15 to 25 cm above the ground.
- — Mechanical post drivers or power augers save labor.
- — Use sharpened posts with mechanical post drivers.
- — Use only good quality fencing materials, such as galvanized staples.
- — Slope staples down into the wood against the pull of the wire.
- — Drive staples diagonally across the wood grain.
- — Do not drive the staples tightly against the wire — wire should be allowed to move.
- — Build fences in sections; splice the wire at corner posts and draw posts.
- — Attach the wire to the livestock side of the posts.
- — Lean posts outwards on curves, such as around sloughs, and attach wire on the outside of the curve.
- — Tighten each wire individually starting at the top wire and working to the bottom wire.
- — Stretch double strand barbed wire before stapling and attaching to corner or brace posts. Single strand barbed wire only requires to be pulled tight before stapling.
- — Space barbed wire evenly on the post by using a stick or handle with the wire spacings marked.
- — Wire stays should not touch the ground in a suspension fence.
- — Brace wires should be made of two loops of 3.7 mm diameter galvanized wire, with the tightening lever left in place for further adjustments.
- — Purchase good wire grips. Cheap wire grips are very dangerous.
- — Inspect rope, chains, etc., of stretching equipment for flaws before starting fencing.
- — Posts can be spaced uniformly by marking a tractor tire and counting the revolutions.
- — Keep the fence line clear of all brush and weeds.
- — Do not step or climb on fence wires.
- — Make fence visible in the bush by attaching cloth tags to the wires.
- — Ground fence to protect livestock and humans from lightning.
- — Do not pull barbed wire off the end of the roll. Unroll it to prevent kinks that may later break during stretching.

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CONVERSION FACTORS

inch x 25.4 = mm
inch x 2.54 = cm
foot x 0.3048 = m
rod x 5 = m
mile x 1.61 = km
acre x 0.405 = ha
pound x 0.4536 = kg
pound/square inch x 6.9 = kPa
gallon x 4.55 = L
(°F −32) x $^5/_9$ = °C